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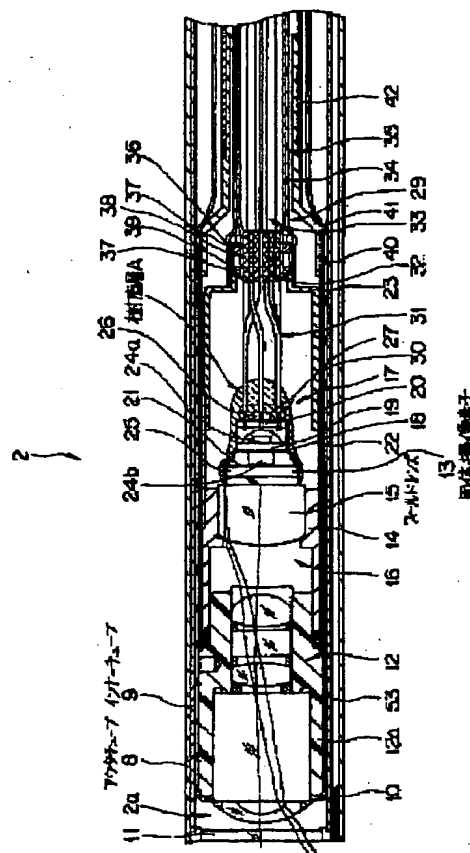
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TITLE : ELECTRONIC ENDOSCOPE



ABSTRACT : **PROBLEM TO BE SOLVED:** To provide an electronic endoscope which prevents the occurrence of trouble, such as peeling, in a joint part, etc., even when autoclave sterilization is repetitively carried out.

SOLUTION: Adhesives are respectively separately applied to the respective parts of a solid-state image pickup element 13, ceramic substrates 19 and 20 and a coated fiber 30 with an insulation tube 31 and thereafter, the solid-state image pickup element 13, the ceramic substrates 19 and 20 and the coated fiber 30 with the insulation tube 31 are coated with the adhesives or packing materials, etc., which are resin members, by which resin layers A are disposed and the solid-state image pickup element 13, the ceramic substrates 19 and 20 and the coated fiber 30 are sealed. At this time, the adhesives constituting the resin layers A are in the state that the adhesives are not adhered at all to a shielding frame 22, cable fixing frame 23, image pickup frame 14 and field lens 15 arranged to cover the solid-state image pickup element 13, the first ceramic substrate 19, the second ceramic substrate 20 and the coated fiber 30 or the state that the adhesives partly adhere thereto.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the electronic endoscope which performs sterilization after an activity with an autoclave.

[0002]

[Description of the Prior Art] The inside of a coelome is observed by inserting the insertion section of ** length into a coelome conventionally, or the endoscopic technique which performs curative treatment using a treatment implement if needed is performed widely.

[0003] There is an electronic endoscope which contained the image pick-up equipment which formed solid state image pickup devices, such as a charge-coupled device (CCD and brief sketch), in the point of the insertion section as said endoscope, for example. With the endoscope equipment which uses this electronic endoscope, the picture signal which picturized and carried out photo electric translation with said solid state image pickup device is generated by the video signal with the signal-processing means which is the external device of an endoscope, outputs this video signal to a monitoring device, and it can perform observation and treatment, observing the endoscope image displayed on the screen of a monitor.

[0004] The image pick-up equipment of said electronic endoscope is structure which fills up the building envelope of a bonnet and this shield member with adhesives for the solid state image pickup device which joined cover glass to the light-receiving side side and the circuit board, and a signal line by the shield member, and closes said solid state image pickup device, the circuit board, and a signal line, as shown in JP,9-56671,A.

[0005] In order that the endoscope used in the medical field might insert the insertion section into a coelome and might observe an organ etc., when the reuse of the endoscope used once was carried out to other patients, it had to perform washing disinfection after inspection / treatment termination from the need of preventing infection between patients by the endoscope.

[0006] As disinfection sterilization processing of these endoscopes etc., gas, such as ethylene oxide gas (EOG), and an antibacterial were used. However, as everyone knows, sterilization gas is deadly poisons and it had the problem that a working stroke benefited the security of a sterilization activity complicated. Moreover, the aeration for removing the gas which adhered to the device after sterilization takes time amount. For this reason, there was a problem that a device could not be used promptly, after sterilization. Furthermore, there was a problem that a running cost became expensive.

[0007] On the other hand, in the case of an antibacterial, management of disinfectant liquid is complicated, and in order to carry out abolition processing of the antibacterial, there is a problem that great costs start.

[0008] So, in recent years, it cannot be accompanied by the complicated activity, but

can be promptly used after sterilization, and autoclave sterilization with a cheap running cost is becoming the mainstream of disinfection sterilization processing of an endoscope device. This autoclave sterilization puts a used endoscope etc. to the bottom of a high voltage elevated-temperature steam, and performs it.

[0009]

Problem(s) to be Solved by the Invention However, when autoclave sterilization of the electronic endoscope equipped with the image pick-up equipment shown in said JP,9-56671,A is carried out, said solid state image pickup device, the circuit board, a signal line, a shield member, and adhesives expand by being put to the bottom of an elevated-temperature steam.

[0010] Since the coefficient of thermal expansion of said adhesives was large compared with other members, such as a solid state image pickup device, the circuit board, a signal line, and a shield member, at this time, when said adhesives expanded, stress might start in the direction which makes the joint of cover glass and a solid state image pickup device exfoliate with the adhesives which expanded.

[0011] And by starting the joint of repeat cover glass and a solid state image pickup device, whenever this stress performs autoclave sterilization, if a joint exfoliates, an endoscope image will deteriorate. Since it was used in the surgery fields, such as laparoscope and thoracoscope, and sterilization in a short time was especially performed by autoclave sterilization with the rigid mirror, what has high autoclave resistance was desired.

[0012] This invention is made in view of the above-mentioned situation, and even when autoclave sterilization is repeated and is performed, it aims at providing a joint etc. with the electronic endoscope which prevented that nonconformities, such as exfoliation, occurred.

[0013]

Means for Solving the Problem An electronic endoscope of this invention is an electronic endoscope equipped with a solid state image pickup device closed in a resin member, joint material by which cementation arrangement is carried out at a light-receiving side side of this solid state image pickup device, and a frame arranged around said solid state image pickup device, when closing said solid state image pickup device by said resin member, at least a part applies said resin member to the condition of having not adhered, to said joint material and frame, and a solid state image pickup device is closed.

[0014] According to this configuration, adhesives which expanded even when adhesives expanded do not give stress to other members at the time of autoclave sterilization. It is prevented certainly that stress starts a joint with joint material arranged at a solid state image pickup device and this solid state image pickup device, and exfoliation starts to a joint by this.

Brief Description of the Drawings

Drawing 1 It is drawing which drawing 1 thru/or drawing 3 require for 1 operation gestalt of this invention, and explains the endoscope system by which drawing 1 was equipped with the electronic endoscope of this operation gestalt.

Drawing 2 Drawing explaining the configuration of insertion circles

Drawing 3 Drawing explaining the configuration of grasping circles

Drawing 4 Drawing where the insertion section explains the configuration of the grasping section of a super-thin electronic endoscope

Description of Notations

2 -- Insertion section

8 -- Outer tube

9 -- Inner tube

- 13 -- Solid state image pickup device
- 15 -- Field lens
- 19 -- The 1st ceramic substrate
- 20 -- The 2nd ceramic substrate
- 30 -- Core wire

[0015]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Drawing 1 thru/or drawing 3 start 1 operation gestalt of this invention, and drawing explaining the endoscope system by which drawing 1 was equipped with the electronic endoscope of this operation gestalt, drawing where drawing 2 explains the configuration of insertion circles, and drawing 3 are drawings explaining the configuration of grasping circles.

[0016] As shown in drawing 1, the endoscope system of this operation gestalt For example, effective length has the hard insertion section 2 in which 300mm and an outer-diameter size formed the sheathing section by the metal member about $\phi 10\text{mm}$. The so-called rigid mirror 1 which is an electronic endoscope having the image pick-up unit later mentioned in the point of this insertion section 2 the abdominal cavity and for the thoraxes, It mainly consists of camera control units 7 equipped with the image-processing circuit which generates the light equipment 6 which is an external device which supplies the illumination light to this rigid mirror 1, and the picture signal transmitted from the image pick-up unit currently arranged in said insertion section 2 to a video signal.

[0017] The grasping section 3 which serves as a control unit is arranged in the end face section of said insertion section 2, and the universal cord 4 which interpolated the signal line, the light guide, etc. in the interior has extended from the end face of this grasping section 3. And light source connector 4a which can be freely detached and attached to said light equipment 6 is prepared in the end face section of this universal cord 4. Moreover, from the flank of said light source connector 4a, the camera cable 5 which interpolated said signal line has extended, and camera connector 5a which can be freely detached and attached to said camera control unit 7 is prepared in the end face section of this camera cable 5.

[0018] The concrete configuration of the insertion section 2 is explained with reference to drawing 2. As shown in drawing, sheathing of the insertion section 2 consists of double pipe structures which piled up a tubular outer tube 8 and a tubular inner tube 9 by the product made from stainless steel. The crevice section is prepared between said outer tubes 8 and inner tubes 9, and the light guide fiber 10 which transmits the illumination light of said light equipment 6 to this crevice section is arranged.

[0019] The cover glass 11 made from sapphire is arranged in the apical surface of said inner tube 9. This cover glass 11 is in the condition which gave the metal coat to the glass flank peripheral face, for example, is joined to the point inner skin of an inner tube 9 in airtight by cementation / closure means, such as soldering and laser welding. By this, it has prevented that a high voltage elevated-temperature steam invades in insertion section building envelope 2a from the head side of said inner tube 9.

[0020] Said cover glass 11 is countered in said insertion section building envelope 2a, the objective lens unit 12 constituted by arranging two or more optical lenses in lens frame 12a made from a ceramic is arranged, and the solid state image pickup device 13 is arranged in the image formation location of this objective lens unit 12.

[0021] Cementation arrangement of said solid state image pickup device 13 is carried out by adhesives at the flat surface of the field lens 15 with which the head side by which adhesion immobilization is carried out at the inner skin end face section of the

metal image pick-up-for example, frame 14 by which it was fixed to the end face section of said lens frame 12a formed the convex and end face side in the flat surface. That is, said solid state image pickup device 13 applies adhesives between the field by the side of light-receiving of this solid state image pickup device 13, and the flat surface of the field lens 15 which is joint material, and is joined. The adhesives used at this time are the epoxy system adhesives of an ultraviolet curing mold. And said solid state image pickup device 13, the image pick-up frame 14, and field lens 15 grade are collectively called the image pick-up section 16. Moreover, said solid state image pickup device 13 is the TAB mounting CCD.

[0022] The cable splicing section 17 is formed in the end face side of said image pick-up section 16, and connection immobilization of the TAB lead 18 which extends from said solid state image pickup device 13 is electrically carried out with solder at the land which is formed in the peripheral face of the 2nd ceramic substrate 20 arranged in the 1st ceramic substrate [which was arranged in the end face side of said solid state image pickup device 13 which constitutes said image pick-up section 16] 19, and end face side of this 1st ceramic substrate 19 and which is not illustrated.

[0023] The adhesives which consist of an insulating member are applied to the outside surface of said TAB lead 18 except said land and the soldering portion soldered. By having applied these adhesives, it has insulated with the metal shield frame 22 and the metal cable fixed frame 23 which are arranged so that the outside surface of the TAB lead 18, the outside surface (metal) of the main part 21 of a chip prepared in said solid state image pickup device 13, and the perimeter of the image pick-up section 16 may be covered and surrounded electrically.

[0024] Electrical parts, such as IC24a and capacitor 24b, are mounted in said 1st ceramic substrate 19. And capacitor 24b located in said solid state image pickup device 13 side is placed in a fixed position on the 1st ceramic substrate 19 by the adhesives which consist of an insulating member. The electric insulation with said capacitor 24b and main part 21 of a chip of said solid state image pickup device 13 is secured by this.

[0025] Moreover, the electrical part of a capacitor 26 and resistance 27 grade is mounted in said 2nd ceramic substrate 20. Two or more through holes 28 are formed in said 2nd ceramic substrate 20, and each core wire 30 of the multi-conductor cable 29 which inserts in the inside of the insertion section 2 is being fixed to these through holes 28 with solder. The insulating tube 31 formed by the insulating member is put on the periphery of these core wires 30.

[0026] And the adhesives as a protective layer which prevent disconnecting the bottom portion of the core wire 30 by which solder immobilization was carried out in the assembly stroke after this soldering when stress starts a solder fixed part etc. are applied to said through hole 28.

[0027] That is, in this operation gestalt, adhesives are applied according to an individual to each part of a solid state image pickup device 13, the 1st ceramic substrate 19, the 2nd ceramic substrate 20, and the core wire 30 with an insulating tube 31, respectively. Then, by applying adhesives or a bulking agent etc. which is a resin member about said solid state image pickup device 13, the 1st ceramic substrate 19, the 2nd ceramic substrate 20, and a core wire 30, and forming the resin layer A Said solid state image pickup device 13, the 1st ceramic substrate 19, the 2nd ceramic substrate 20, and a core wire 30 are closed.

[0028] At this time, the adhesives which constitute said resin layer A The condition of not adhering to said solid state image pickup device 13, the 1st ceramic substrate 19, the 2nd ceramic substrate 20, said shield frame 22 arranged so that a core wire 30 may be covered, the cable fixed frame 23, the image pick-up frame 14, and the field lens 15 at all, Or it is in the condition that some adhesives adhere, and the condition that said resin

layer A does not adhere to the shield frame 22, the cable fixed frame 23, the image pick-up frame 14, and the field lens 15 at all is most desirable gestalt.

[0029] The 1st shield 32 whose diameter of a strand carried out the braid of the tinning copper wire which is about about 0.05mm, and formed it is formed in the periphery of the core wire 30 with said insulating tube 31. Moreover, the 2nd shield 34 whose diameter of a strand carried out the braid of the tinning copper wire which is about about 0.08mm, and formed it so that the 1st pre-insulation 33 might be formed in the periphery of this 1st shield 32 and said 1st pre-insulation 33 whole might be covered and wrapped further is formed. And the 2nd pre-insulation 35 which insulates the conductive member arranged around this 2nd shield 34 and said 2nd shield 34 is formed in the periphery of said second shield 34.

[0030] After being bound in one with copper wire 36, potential equalization of the 1st shield 32 of said core wire 30 is carried out with solder in this copper wire 36 and said 1st shield 32, and it is joined.

[0031] And after constituting said core wire 30 as mentioned above, the end face side of the cable fixed frame 23 is arranged around said cable splicing section 17. At this time, abbreviation coincidence of the opening 37 prepared in the side of this cable fixed frame 23 and the location of said copper wire 36 is carried out, and after coiling and binding copper wire 38 tight from this opening 37 side, the electric conduction adhesives 39 are slushed and stiffened from said opening 37 portion. This is fixed in one in the condition of having been potential-ized [fixed frame / 23 / said 1st shield 32, the 2nd shield 34, / cable].

[0032] On the other hand, the shield frame 22 is being fixed to the head side of said cable fixed frame 23 in one by solder or electric conduction adhesives. And the head side of said shield frame 22 is being fixed to said image pick-up frame 14 in one by electric conduction adhesives.

[0033] Moreover, the metal head pipe 40 is being fixed to the end face side periphery of said cable fixed frame 23 in one by electric conduction adhesives. And the point of the head side bond pipe 41 is being fixed to the end face section inner skin of this head pipe 40 in one by electric conduction adhesives.

[0034] The point of the narrow diameter pipe 42 formed to the outer-diameter size of said head pipe 40 with 60 to about 70% of outer-diameter size fits into the end face section of said head side bond pipe 41, and it is fixed in one by electric conduction adhesives. And this narrow diameter pipe 42 inserted in the inside of the insertion section 2, and has extended the end face section to said about three grasping section.

[0035] The concrete configuration of the grasping section 3 is explained with reference to drawing 3 . Said head side bond pipe 41 and the back end side bond pipe 43 constituted like abbreviation are being fixed to the end face section inner skin of the narrow diameter pipe 42 which extended to said about three grasping section as shown in drawing in one. The pipe receptacle 45 made from stainless steel which formed the insulating pipe 44 in the inner skin side is arranged in the end face section of the one end bond pipe 43 after this, and connection immobilization is carried out after the hermetic connector 46 made from stainless steel has flowed electrically in the end face section of this pipe receptacle 45.

[0036] The pipe 47 made from stainless steel is joined to the peripheral face of said hermetic connector 46 by laser welding in airtight. Moreover, the airtight frame 48 made from stainless steel is joined to the peripheral face side of this pipe 47 in airtight with RF solder. Furthermore, the point of this airtight frame 48 is joined to said ceramic frame 49 in airtight with RF solder.

[0037] On the other hand, the inlet connection material 50 made from stainless steel is joined to the point of said ceramic frame 49 by laser welding in airtight. The pore into

which the peripheral face of said inner tube 9 fits is formed in the point of this inlet connection material 50, and the inner tube 9 and the inlet connection material 50 which fitted into this pore are joined in airtight in laser welding.

[0038] The breakthrough for arranging the pin 51 for two or more signal transmissions is formed in the center section of said hermetic connector 46, and cementation immobilization between the main part section of this hermetic connector 46 and the glass 52 for airtight and of between the glass 52 for airtight and pins 51 is carried out in airtight by closing the glass 52 for airtight in the condition of having arranged said pin 51 to this breakthrough:

[0039] In addition, the core wire 30 which inserted in said insertion section 2 and extended, and the end face section of said 1st shield 32 are electrically connected to the point of the pin 51 which projects from the apical surface side of said hermetic connector 46 by solder. Moreover, the point of the cylinder-like solder receptacle 54 is joined to the end face section of this pin 51 by low attachment etc., and the end section of two or more core wires 56 by which interpolation is carried out to the cable 55 which connected the other end to CCU7 is being electrically fixed to the end face section of this solder receptacle 54 with solder.

[0040] By having constituted the joint of each part material as mentioned above, as for the building envelope surrounded by the cover glass 11 shown by drawing 2 and drawing 3, an inner tube 9, the inlet connection material 50, the ceramic frame 49, the airtight frame 48, a pipe 47, and the hermetic connector 46, an airtight condition is secured thoroughly. That is, the elevated-temperature high voltage steam at the time of autoclave sterilization does not trespass upon said building envelope by having constituted the rigid mirror 1 from this structure.

[0041] On the other hand, in order to insulate electrically all the components arranged in the inner skin side of this outer tube 8 in said outer tube 8, heat-shrinkable tubing 53 is put over said objective lens unit 12, the image pick-up frame 14, the shield frame 22, the head pipe 40, the head side bond pipe 41, the narrow diameter pipe 42, and the back end side bond pipe 43.

[0042] Although it is not necessary at this time to put said heat-shrinkable tubing 53 since lens frame 12a of said objective lens unit 12 is a product made from a ceramic, that the creeping distance should be secured in order to raise withstand voltage more, the point of heat-shrinkable tubing 53 was extended from the apical surface of the head pipe 40 to 4mm thru/or 5mm head side, and the objective lens unit 12 is covered. Electric safety improves more by this.

[0043] In addition, although all members are made the wrap configuration with one heat-shrinkable tubing 53 in this operation gestalt, you may constitute so that the heat-shrinkable tubing of others [pipe / 41 / from the objective lens unit 12 to / head side bond / overall length / from one heat-shrinkable tubing and head side bond pipe 41 edge to / narrow diameter pipe 42] and the back end side bond pipe 43 may be covered with three heat-shrinkable tubing, such as covering independently with another heat-shrinkable tubing, respectively, for example. In this case, in order to secure the creeping distance on electric safety, the portion with which heat-shrinkable tubing laps is prepared 4mm - 5mm.

[0044] Even if it is which case, heat-shrinkable tubing is put on the portion from the objective lens unit 12 to the head side bond pipe 41 so that the objective lens unit 12 and the image pick-up section 16 may not be deformed and damaged by oscillation etc., and fitting arrangement is carried out in this condition at the inner circumference of an inner tube 9.

[0045] Two or more core wires 56 joined to the solder receptacle 54 by low attachment etc. cover a point in the resin pipe 57 for an insulation, it is surrounded, and the space

section of this resin pipe 57 is filled up with the bulking agent 58 which consists of silicone rubber for carrying out maintenance immobilization of these core wires 56 stably.

[0046] Moreover, screwing immobilization of the protection frame 59 made from stainless steel is carried out through the screw section 60 at the hermetic connector 46 for the object which protects said core wire 56, the resin pipe 57, and a bulking agent 58 to the peripheral face side of said resin pipe 57. Said protection frame 59 and hermetic connector 46 are electrically connected by this.

[0047] Furthermore, said two or more core wires 56 are put together with the reticulated shield 61, and are electrically connected with said protection frame 59 through the ferrule 63 arranged so that it might be pressed by the screw 62 formed in the end face side of said protection frame 59, and the apical surface of this screw 62. This ferrule 63 is electrically connected with the reticulated shield 61 by being pressed from an outside with a screw 62.

[0048] That is, the pipe receptacle 45 which is a portion by the side of a head, the back end side bond pipe 43, the narrow diameter pipe 42, the head side bond pipe 41, the head pipe 40, and the image pick-up frame 14 are electrically connected rather than said hermetic connector 46.

[0049] therefore -- since said reticulated shield 61 becomes the same as the condition of having extended to a part for the end face flank of the objective lens unit 12, and having covered said solid state image pickup device 13 grade, substantially -- a solid state image pickup device 13 and core wire 30 grade -- minding -- harmful electromagnetism -- generating a noise **** -- external electromagnetism -- receiving a noise has decreased dramatically.

[0050] In addition, the cylinder-like rubber ring 64 is arranged at the periphery of said cable 55, and this rubber ring 64 is arranged at the hole 65 currently formed in the end face section of said protection frame 59, and is pressed with the screw 66 from the end face side. While fixing said cable 55 to the protection frame 59 by this, when stress, such as hauling, pushing, and bending, starts the end face side of said cable 55, it has the composition of not having effect of stress on a head side from said ferrule 63.

[0051] And wrap grasping section main part 3a is being fixed to the end face section of an outer tube 8 from the inlet connection material 50 constituted as mentioned above watertight even to the screw 66.

[0052] Thus, a solid state image pickup device, the 1st ceramic substrate, the 2nd ceramic substrate, When applying adhesives according to an individual to each portion of a core wire, applying adhesives so that a solid state image pickup device, the 1st ceramic substrate, the 2nd ceramic substrate, and a core wire may be covered and wrapped after that, and forming the resin layer A, The edge of this resin layer A A solid state image pickup device, the 1st ceramic substrate, the 2nd ceramic substrate, the condition of not adhering to the shield frame arranged in the perimeter of a core wire, a cable fixed frame, an image pick-up frame, and a field lens at all -- or By having constituted so that it may be in the condition that other portions have not adhered even if it adheres, a part When a solid state image pickup device, the 1st ceramic substrate, the 2nd ceramic substrate, a core wire, and the resin layer A expand thermally by the high temperature at the time of autoclave sterilization, respectively, When this resin layer A expands, the stress generated between a shield frame, a cable fixed frame, an image pick-up frame and a field lens, and a solid state image pickup device can be prevented.

[0053] That is, the stress of the condition that a resin layer does not adhere to a shield frame, a cable fixed frame, an image pick-up frame, and a field lens at all, or a part which attains to the joint of a field lens and a solid state image pickup device is lost by

having changed into the condition that other portions have not adhered even if it adheres. Since it is prevented by this that cover glass or a lens joined to a solid state image pickup device and this image sensor exfoliates even if it performs repeat autoclave sterilization, the image deterioration generated by exfoliation of a joint is lost.

[0054] In addition, although the member joined to a solid state image pickup device 13 in this operation gestalt is used as glass members, such as a lens, the member joined to a solid state image pickup device 13 is not limited to a glass member, and may be joined to a metal frame or a ceramic frame. Also in this case, the resin layer A applied to the surroundings of a solid state image pickup device 13 like **** does not adhere at all to a metal frame etc., or a part is the configuration that other portions do not adhere even if it adheres. By this, exfoliation of the joint between the solid state image pickup device 13 at the time of autoclave sterilization, a metal frame, or a ceramic frame is prevented.

[0055] By the way, although the rigid mirror 1 shown with the operation gestalt mentioned above was an electronic endoscope which has arranged the solid state image pickup device 13 to the point of the insertion section 2, an electronic endoscope with which the outer-diameter size of the insertion section 2 was equipped with the super-thin insertion section 2 not more than $\phi 5\text{mm}$ from a viewpoint of the reduction in the invasion of a surgical operation as opposed to said rigid mirror 1 whose outer-diameter size is about $\phi 10\text{mm}$ is desired.

[0056] However, since it is difficult to arrange a solid state image pickup device 13 in the interior of the super-thin insertion section 2, in constituting the electronic endoscope mentioned above, it takes the structure which arranges the relay lens which can form an outer-diameter size in a byway in the insertion section 2, and arranges a solid state image pickup device 13 in the grasping section 3. In addition, it is necessary to make it correspond to autoclave sterilization also with the super-thin electronic endoscope of this structure naturally.

[0057] For this reason, it is in the airtight condition thoroughly about the building envelope which joined in airtight and was surrounded with these components like the operation gestalt which mentioned above the cover glass which consists of the hermetic connector 46, a pipe 47, the airtight frame 48, the ceramic frame 49, the inlet connection material 50, an inner tube 9, and sapphire at a head that is not illustrated as shown in drawing 4.

[0058] Moreover, in order to prevent exfoliation of the joint of the member joined to the solid state image pickup device and the solid-state **** element also in this super-thin electronic endoscope at the time of autoclave sterilization, even if the adhesives applied to the surroundings of a solid state image pickup device 13 do not adhere to the maintenance frame 102 at all or it compares and adheres, it is only a part and other portions have not adhered.

[0059] However, the following problems are on an assembly. In case it carries out insertion arrangement of that it is necessary to make in agreement the optical axis of the relay lens 100 arranged inside the insertion section 2, and the optical axis of a solid state image pickup device 13 and, and the inner tube 9 at an outer tube 8, it is making in agreement the medial axis of the pipe receptacle 109 and the medial axis of the lens frame 110 which are being fixed previously.

[0060] And when the medial axis of said pipe receptacle 109 and the medial axis of said lens frame 110 are not in agreement, the outer-diameter section of the hermetic connector 46 of one should be caught in a pipe 47 at said lens frame 110, and it should become insertion impossible. For this reason, the optical axis of said relay lens 100, the optical axis of a solid state image pickup device 13 and the medial axis of the pipe receptacle 109, and the medial axis of the lens frame 110 are made in agreement in this operation gestalt by establishing a fine adjustment means, without depending only on

the process tolerance and assembly precision of the usual lens, a frame, etc.

[0061] It has the 2nd fine adjustment device for adjusting the 1st fine adjustment device for adjusting the optical axis of a relay lens 100, and the optical axis of a solid state image pickup device 13 as a fine adjustment means in this operation gestalt, as shown in drawing, and the medial axis of the pipe receptacle 109 and the medial axis of the lens frame 110.

[0062] Said 1st fine adjustment device forms two or more stretching screws 103 which set up small the outer-diameter size of the maintenance frame 102 of said solid state image pickup device 13, penetrated on the side of said frame 101 to the bore of the frame 101 by the side of the end face of said relay lens 100, and projected in the inner skin side, and is constituted. Therefore, the amount of bell and spigots of two or more stretching screws 103 (the amount of projection by the side of inner skin) is adjusted suitably, the optical axis of a solid state image pickup device 13 is moved to the optical axis of a relay lens 100, and alignment can be performed. And the optical axis of a relay lens 100 and the optical axis of a solid state image pickup device 13 will be in agreement by carrying out positioning immobilization after alignment adjustment termination.

[0063] On the other hand, the 2nd fine adjustment device forms two or more stretching screws 104 which set up the inside diameter of said pipe receptacle 109 greatly, penetrated on the side of this pipe receptacle 109 to the outer-diameter size of said maintenance frame 102, and projected in the inner skin side, and is constituted. Therefore, the medial axis of the hermetic connector 46 which adjusts suitably the amount of bell and spigots of two or more stretching screws 104 (the amount of projection by the side of inner skin), and is connected to the pipe receptacle 109 and this pipe receptacle 109 is moved to the shaft center said whose relay lens 100 and solid state image pickup device 13 correspond, and alignment can be performed. And the medial axis of the hermetic connector 46 and the medial axis of the lens frame 110 will be in agreement by carrying out positioning immobilization after alignment adjustment termination.

[0064] By establishing the fine adjustment device mentioned above, it becomes possible to insert an inner tube 9 to an outer tube 8 easily and certainly.

[0065] In addition, said maintenance frame 102 has desirable insulating members, such as a viewpoint to a ceramic which performs an electric insulation.

[0066] Moreover, the electrical installation of said solid state image pickup device 13 and pin 51 of the hermetic connector 46 is connected by the simple line 105 which does not have the shield. The simple line 105 is easier for handling than the coaxial line which has a shield, and since the linear dimension on an assembly is short and ends, this can attain shortening of grasping section 3 overall length by using the simple line 105.

[0067] Furthermore, when said stretching screw 104 is removed, accidentally, the maintenance frame 102 fell in the hermetic connector 46, in order to prevent damaging pin 51 grade, the migration specification-part material 106 which **** on the side of the lens frame 110, such as a screw and a rivet, was formed, and the nonconformity at the time of an assembly is abolished.

[0068] In addition, deformation implementation is variously possible for this invention in the range which is not limited only to the operation gestalt described above and does not deviate from the summary of invention.

[0069] According to the above-mentioned operation gestalt of this invention which was explained in full detail more than the [additional remark], the configuration like a less or equal can be obtained.

[0070] (1) It is the electronic endoscope which at least the part applied said resin

member to the condition of having not adhered, to said joint material and frame, and closed the solid state image pickup device in the electronic endoscope equipped with the solid state image pickup device closed in a resin member, the joint material by which cementation arrangement is carried out at the light-receiving side side of this solid state image pickup device, and the frame arranged around said solid state image pickup device when closing said solid state image pickup device by said resin member.

[0071] (2) Said resin member is the electronic endoscope of the additional remark 1 publication which is adhesives or a bulking agent.

[0072] (3) Said joint material is the electronic endoscope of the additional remark 1 publication which is a glass member, a metal member, or a ceramic member.

[0073] (4) Said frame is the electronic endoscope of the additional remark 1 publication which consists of metal members.

[0074] (5) The electronic endoscope of the additional remark 1 publication which carried out cementation immobilization of said solid state image pickup device and said joint material with adhesives.

[0075] (6) Said adhesives are the electronic endoscopes of the additional remark 5 publication which is the adhesives of an ultraviolet curing mold.

[0076] (7) Said adhesives are the electronic endoscopes of the additional remark 5 publication which is epoxy system adhesives.

[0077]

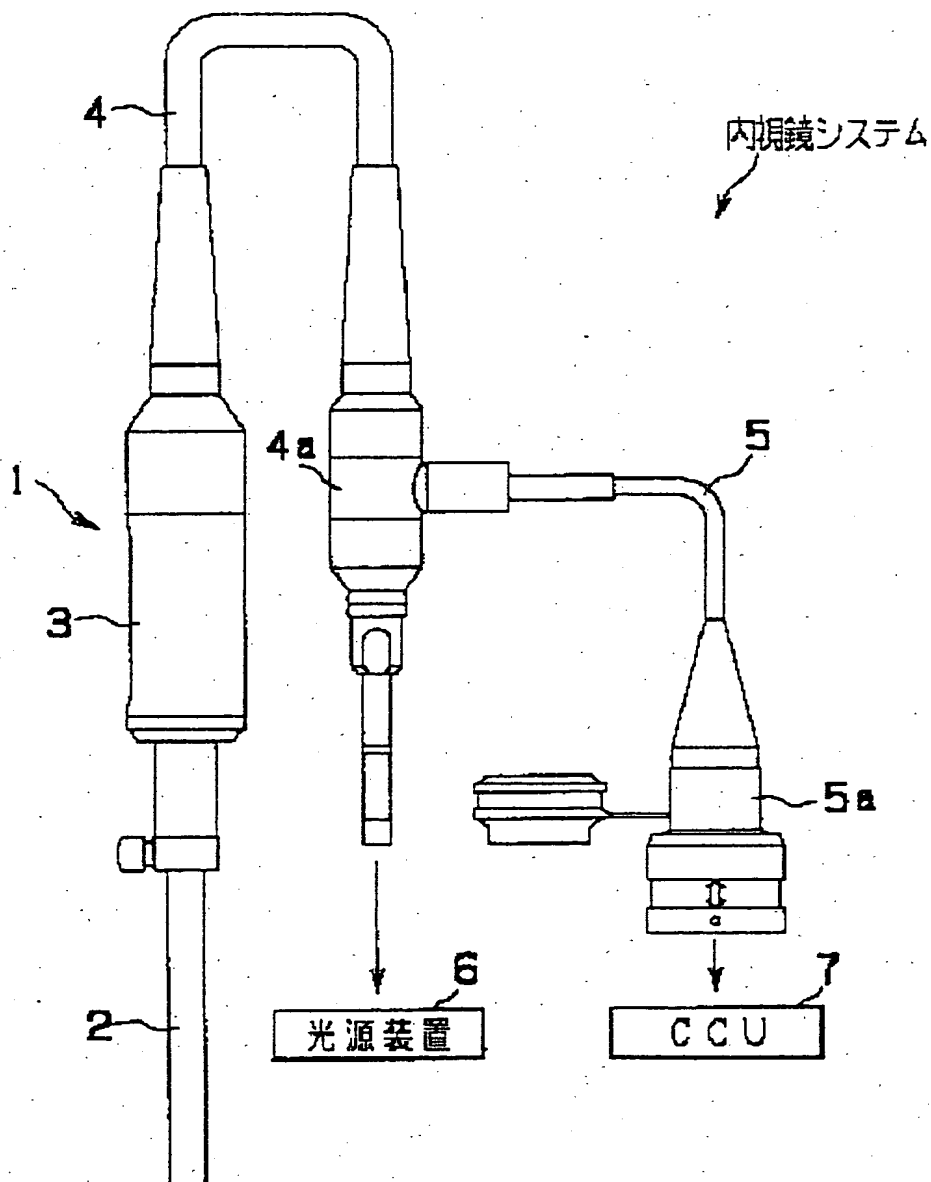
[Effect of the Invention] A joint etc. can be provided with the electronic endoscope which prevented that nonconformities, such as exfoliation, occurred, even when according to this invention autoclave sterilization is repeated and is performed, as explained above.

CLAIMS

[**Claim 1**] It is the electronic endoscope characterized by for at least a part having applied said resin member to the condition of having not adhered, to said joint material and frame, and closing a solid state image pickup device in an electronic endoscope equipped with a solid state image pickup device closed in a resin member, joint material by which cementation arrangement is carried out at a light-receiving side side of this solid state image pickup device, and a frame arranged around said solid state image pickup device when closing said solid state image pickup device by said resin member.

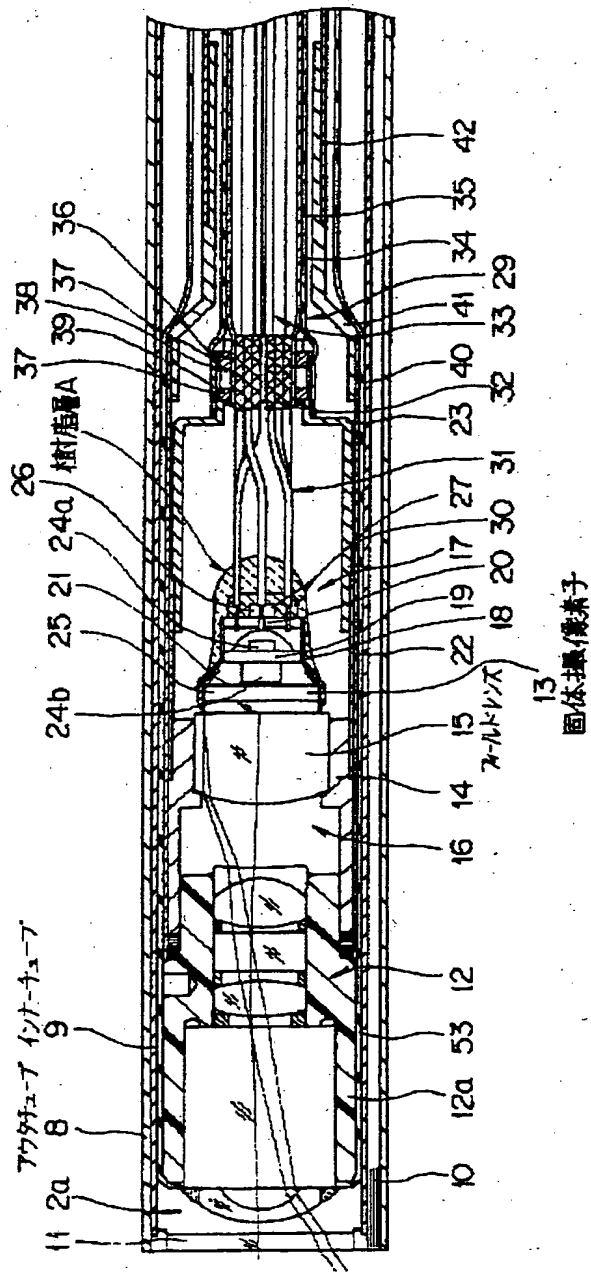
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Drawing selection drawing 1

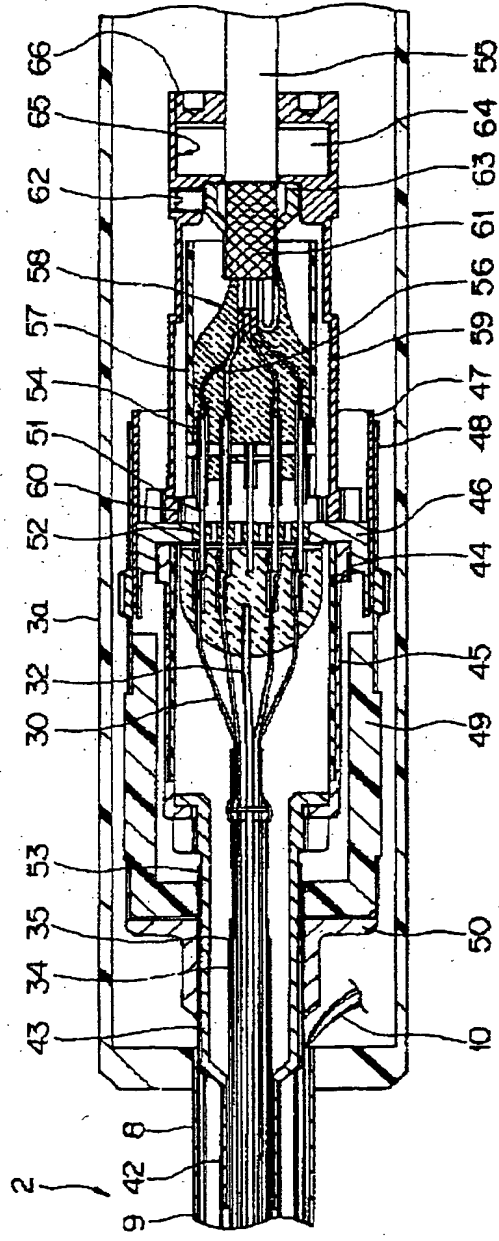


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3



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Drawing selection  drawing 4

